

Product Contract

2.009 Purple Team

Mission Statement: To create an ergonomic and economic pedal-powered water pump to efficiently irrigate up to 2 acres of land in underdeveloped countries.

Intended Customers: Small scale farmers in developing countries

Market: Low cost, human powered irrigation pumps

Customer Need	Product Attribute(s)	Engineering Specification(s)
Ergonomic	recumbent seat and pedal design	seat with back support, pedals 2-4 feet from seat
	continuous cyclical motion	human powered rotary motion transmitted into linear motion for pumping mechanism
	comfortable and sustainable operation	user can easily provide 3 working hours on machine without major bodily strain
Economic	inexpensive	product costs \$100
		manufactured and assembled regionally
Intuitive user interface and easy maintenance	spare parts and materials are easily obtainable	manufactured and assembled regionally
Durability	robust to sediment in water flow	can pass particles less than 0.25 inches in diameter
	rugged construction for transport through rural landscape	surrounding structure constructed from robust materials, not easily deformable
	critical components have long life	moving part life of 3000 hours
	resistant to high moisture environment	constructed with materials that don't rot or rust

Can be used on varying terrain	Stability	base contacts terrain at only 3 points
Provide irrigation to small scale farm	Provide sufficient water to irrigate up to 2 acres of land	Pump 1.6 L/s at 3.2m head Pump 0.4 L/s at 12.5m head (see Figures 1 and 2 below)
	Pull water up from water sources below irrigation site	draw water from 7m depth
	Have sufficient delivery range	12m of output head
Portability	Lightweight	50 lbs
	Compact	maximum 4 ft length

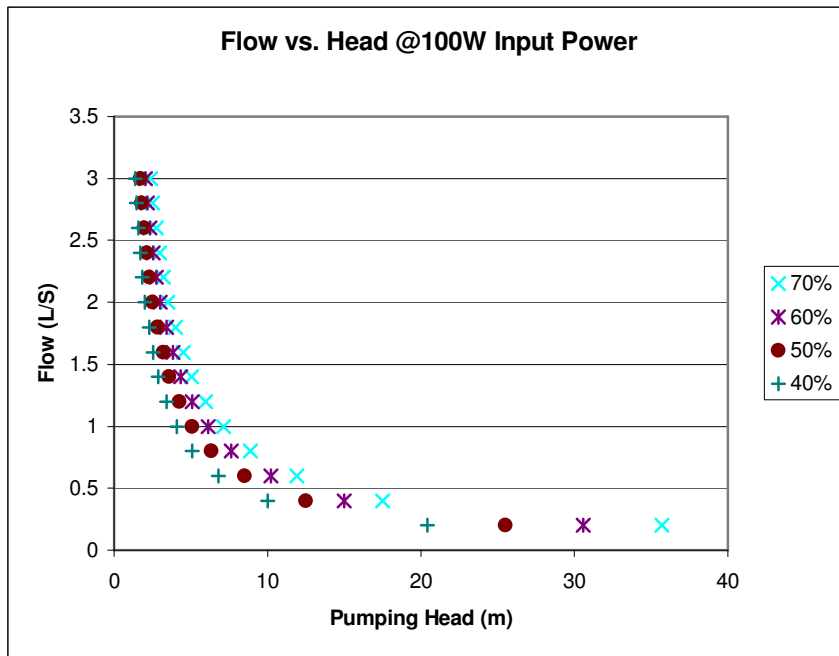


Figure 2: Target flow vs. head curves for realistic pump efficiencies.